

CLAIMS

What is claimed is:

1. A polymer for use in dental restoratives wherein the polymer has a backbone structure comprising:
 - a) a first monomer unit comprising a carboxylic acid-functionalized vinyl monomer; and
 - b) a second monomer unit comprising a vinyl amide.
2. The polymer of claim 1, wherein the polymer further comprises a free-radical or visible light curable moiety pendant to the polymer backbone.
3. The polymer of claim 2 wherein said free-radical or visible light curable moiety is selected from the group consisting of vinyl-substituted unsaturated cyclic imino ethers, 2-isocyanatoethyl methacrylate, and glycidyl methacrylate.
4. The polymer of claim 1 wherein said carboxylic acid-functionalized vinyl monomer is selected from the group consisting of acrylic acid, maleic acid, itaconic acid, methacrylic acid, citraconic acid, N-acryloyl substituted amino acids, N-methacryloyl substituted amino acids, and combinations thereof.
5. The polymer of claim 4, wherein said polymer comprises at least two of said carboxylic acid-functionalized vinyl monomers.
6. The polymer of claim 1 wherein the vinyl amide is selected from the group consisting of acrylamide, methacrylamide, dimethylacrylamide, isopropylacrylamide, N-vinyl-2-pyrrolidone, N-vinylcarbazole, N-vinylsuccinimide, N-vinylcaprolactam, and N-vinylimidazole.
7. The polymer of claim 6 wherein the vinyl amide is N-vinyl-2-pyrrolidone.

8. The polymer of claim 1 wherein the concentration of the vinyl amide ranges from about 5 to about 25 mole percent.

9. The polymer of claim 8 wherein the concentration of the vinyl amide ranges from about 5 to about 10 mole percent.

10. A polymer for use in dental restoratives wherein the polymer has a backbone structure comprising:

- a) a first monomer unit comprising a carboxylic acid-functionalized vinyl monomer; and
- b) a second monomer unit comprising a free-radical polymerizable amide.

11. A dental restorative comprising:

- a) the polymer of claim 1; and
- b) an inorganic glass powder;

wherein the dental restorative is formed when said polymer is blended with said inorganic glass powder.

12. The dental restorative of claim 11, wherein the polymer has a molecular weight in the range of about 10,000 to about 100,000.

13. The dental restorative of claim 11 wherein the inorganic glass powder is a calcium fluoroaluminosilicate glass.

14. The dental restorative of claim 11 further comprising a free-radical or visible light curable moiety pendant to said polymer, said free-radical or visible light curable moiety selected from the group consisting of vinyl-substituted unsaturated cyclic imino ethers, 2-isocyanatoethyl methacrylate, and glycidyl methacrylate.

15. A method for preparing a polymer to be used in dental restoratives comprising:

- a) polymerizing monomers comprising:

- i) carbon chains containing a carboxylic acid group at one or both ends and containing at least one carbon-carbon double bond; and
- ii) a vinyl amide; and
- b) recovering said polymer from the reaction mixture.

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16. The method of claim 15, wherein the recovered polymer is reacted with vinyl-substituted unsaturated cyclic imino ethers, 2-isocyanatoethyl methacrylate, or glycidyl methacrylate, to produce a visible light-curable polymer.

10 17. A free-radical or visible light curable dental restorative comprising:

- a) the polymer of claim 16; and
- b) an inorganic glass powder.

18. A method for preparing a dental restorative comprising:

- a) blending reactants comprising:
 - i) a polymer formed from at least one carboxylic acid-containing vinyl monomer and at least one vinyl amide monomer;
 - ii) an inorganic glass powder; and
- b) applying the blended reactants to a dental area in need of restoration; and
- c) curing the applied blended reactants.

19. A kit for use in making dental restoratives comprising:

- a) a polymer comprising carboxylic acid groups and amide groups; and
- b) an inorganic glass powder;

25 wherein the dental restorative is made by blending said polymer with said inorganic glass powder.

20. A kit for use in making dental restoratives comprising:

- a) a carboxylic acid-containing vinyl monomer;
- b) a free-radical polymerizable amide-containing monomer; and
- c) an inorganic glass powder;

wherein a polymer is formed from said carboxylic acid-containing vinyl monomer and said free-radical polymerizable amide and said inorganic glass powder is blended with the polymer to form the dental restorative.